Illinois Mathematics and Science Academy
1500 Sullivan Road
Aurora, IL 60506-1000

Application For SIR Placement at Fermi National Accelerator Laboratory (FNAL)

(provide two recommendations – see rec form; please use a computer to complete this application legibly)

Name: Saltus (Last) Braden (First) Jake (Middle) Date: 5/22/2015 (month / day / year)

Home Address: 972 Stonewood Glen (Number and Street)

Geneva (City) Illinois (State) 60134 (Zip Code) Home Telephone: 2177753562 (include area code)

Person to be notified in an emergency: IMSA 6309075000

Telephone (office hours): _____ (include area code) Telephone (other hours): _____ (include area code)

Student Cell Phone: 217 775 3562 Year of Graduation: 2017

Suggested FNAL Advisor: Brendan Casey

Gender: ☒ male ☐ female Age: 16 Country of Citizenship*: USA

*Citizens other than from the United States must complete the following information:

Permanent Resident: ☒ Yes ☐ No

Place of Birth: _____ (City, State, Country)

Passport No.: N/A Expiration Date: _____

All non-U.S. citizens must present their original, unexpired foreign passport on the first day of the program. Photocopies are not acceptable. Depending on your circumstances, you also must present:

- Form I-94 Arrival Departure Card that shows lawful admission to the U.S. and the end date of your "authorized stay", **PLUS:**
  - Form I-797 Notice of Action approving H-4, O-3, TD, E-3 or other nonimmigrant (temporary) visa status in the U.S. , OR
  - Form DS-2019 Certificate of Eligibility for J-2 status, OR
  - Form I-20 showing F-2 status, **OR**
- Greencard (Alien Registration Card, or I-551 Card) showing grant of lawful permanent resident status.

Describe your skills, abilities, proficiencies; please be honest.

Highest Math Level/Skill: BC calculus I

Skill with Statistics: I am familiar and have performed ANOVA tests, t-tests, comparisons, etc. (Microsoft excel). I know what p values, variances, standard error and other like outputs of those tests are

Science Classes: Chemistry, Biology, Physics: all of sophomore level. Also a one week course about physics of atomic nuclei.

Describe Your Laboratory Skills: I have performed many chemistry, biology, and physics labs before. I am familiar with noting data, and writing lab reports.

Prior Research (SIR) Experience (include advisor name/location): N/A

Computer Proficiency: Please indicate your skill level for each of the below.

	none	introductory	intermediate	advanced
Basic	X			
C/C++	X			
Fortran	X			
Java	X			
Other Languages(list)	X			
Mathematica	X			
Matlab	X			
Other Programs (list) Desmos woframalpha				 X X
Unix(Linux)	X			
Windows			X	
Mac			x	
Other OS (list)	X			

Rank Your Interests (Do not rank any area that you would not be willing to pursue an investigation in.)

__x_Accelerator Component Testing, Theory and Design
__x_Astrophysics Data Analysis, Detector Development, Theory
___Computer Networking, Computing for Analysis, Data Analysis of Experiments, Computer Simulation and Modeling
_x__Detector Design and Testing
_x__Electronics Design and Testing
_x__Instrumentation and Diagnostics
___Radiofrequency (RF) Systems
_x__Magnet Systems
___Mechanical Design and Development
_x__Particle Physics Phenomenology
_x__Particle Physics Theory
_x__Superconducting Technology

Attach an application that includes the following items:

- Academic honors and awards that you have received. Please limit to ten or less honors/awards that you feel are the most significant.
- Extracurricular activities, interests, and any leadership role(s). Please limit to ten or less activities/interests that you feel are the most significant.
- Explain why research at FNAL would be a benefit to you and what you expect from participation in an investigation at FNAL. (Limit your answer to 250 words or less.)
- What would you tell a FNAL scientist about yourself so that you would be selected to work with her or him? (Limit your answer to 250 words or less.)
- Explain one exceptional experience you had with STEM in the last year. (Limit your answer to 250 words or less.)

Placement at FNAL also requires:

- Fermilab Visitor ID Form (form attached)
- Proof of Medical Coverage (form attached)
- Work Permit (required of students who are under 16 years of age)
- Documentation of Immigration Status (see first page)
- Authorization for Issuance of an ID Card (form attached)
- Student Registration (form attached)

- Note that some information is repeated on the attached forms, which will be filed with the appropriate offices at FNAL once a student has a specific placement.

I understand that by submitting this application for placement at the **Fermi National Accelerator Laboratory** *I may not apply for or seek other SIR opportunities until a decision has been made about this application. Placement for SIR at FNAL is not guaranteed by submission of this application.*

5·27·15

Signature of Parent/Guardian Date

NATE SALTUS

5-28-2015

Signature of Applicant Date

BRADEN SALTUS

Honors/awards:

Throughout middle and pre-IMSA school, I always was on high honor roll.

Extra-circulars:

7^{th},8^{th},and 9^{th} grade scholastic bowl

9^{th} grade tennis

9^{th} grade engineering club (Co-President)

10^{th} grade Improv Club

10^{th} grade Water Polo

10^{th} grade Aspiring Artists Symphony

10^{th} grade production of "The Robbers"

Explain why research at FNAL would be a benefit to you and what you expect from participation in an investigation at FNAL. (Limit your answer to 250 words or less.)

Research at Fermilab will provide me with research knowledge and experience. When I go into working on research teams in college and after I graduate, I will have prior knowledge which will help me excel in those positions. Also: researching at Fermilab is a fun and exciting opportunity to explore more about new and different discoveries. Even though IMSA has many amazing courses where we can learn about many branches of science, these classes do not give a hands-on opportunity for us to go in and perform experiments etc. to learn that way. That is why IMSA established the SIR program; to take advantage of this program, I am now applying to do that kind of real-world scientist learning and doing that an SIR provides.

What would you tell a FNAL scientist about yourself so that you would be selected to work with her or him? (Limit your answer to 250 words or less.)

Hello, My name is Braden Saltus. I am currently a sophomore at Illinois Math and Science Academy. I am interested in doing an SIR for the 2015-2016 academic year.

My favorite class has been physics. I especially enjoy calculating and quantifying actions in the real world and investigating the "why?"s of occurrences. I also took a semester long course in research methods which acquainted me with statistical analyses and in that class did a project on chlorophyll concentrations varying with fertilizer. Additionally, I have also taken a week long course in physics of atomic nuclei specializing in radiations. I am good at following directions and learning quickly.

Particle physics interests me because it deals with muons, neutrinos, quarks, etc. that I have not learned much about as to now. Next year, I will be taking a course at IMSA about modern physics, however I want to learn all that I can about this that I have not been taught; because, frankly, it's exciting, new, and interesting. By working with you, I will be able to satisfy some of this curiosity; while engaging in real-world scientific research and experimentation.

Explain one exceptional experience you had with STEM in the last year. (Limit your answer to 250 words or less.)

IMSA has a week at the beginning of spring semester called intercession where all the students are enrolled in an all-day class for the entire week. The class I was in for this week was Physics of Atomic Nuclei. This was a very interesting course because it had many things that were new and unknown to me before. I learned about pions and muons and neutrinos and photons; all in different ways than I had known. It was all so, almost, magical. Even in fantasy magic there are rules to what a magic person can do or not. And that's what makes the story interesting. Same with this. Energy was released from reactions through neutrinos that appeared. There were small imbalances in energy input and output; making it seem possible for matter-energy conversions. That was really my main fascination. The implications of being able to control such reactions in specific ways would allow for so many revolutions. This is more-or-less the brink of discovery (without much technical). It was rather amazing to realize that all these things were possible.

Student Name: SALTUS, Braden J
Date of Birth: 01/18/1999
Entry Date: 08/14/2014

Illinois Mathematics and Science Academy
School Code:140177

		Sem1	Sem2	Credit
Y14-15				
Grade 10	Literary Explorations I	B		0.50
Grade 10	Literary Explorations II		B	0.50
Grade 10	Concert Band	A	A	1.00
Grade 10	American Studies	A-	B	1.00
Grade 10	Mathematical Investigations IV	B+		0.50
Grade 10	BC Calculus I		B+	0.50
Grade 10	Scientific Inquiries - Chemistry	A-		0.50
Grade 10	Scientific Inquiries - Physics		A	0.50
Grade 10	Scientific Inquiries - Biology		B	0.50
Grade 10	Methods in Scientific Inquiry	B+		0.50
Grade 10	Moving and Learning	A	A	0.50
Grade 10	Mandarin Chinese I	A	A	1.00

Diane M Stegmeyer

Registrar 06/10/2015

Academic Program
All IMSA courses are college preparatory.

Explanation of Grades

A	Exceeds course requirements
B	Meets course requirements
C	Needs improvement
D	Does not meet course requirements; no Academy credit awarded
I	Incomplete, course requirements not completed when grades were issued
WF	Withdrawn from course with failing grade; no Academy credit awarded
W	Withdrawn from course; no Academy credit awarded

Pass/Fail Options

P+	Exceeds course requirements (Pass with Distinction, used only in Independent Study and Student Inquiry and Research courses)
P	Meets course requirements; Academy credit may/may not be awarded depending on course grading criteria
F	Does not meet course requirements for course taken pass/fail; no Academy credit awarded

Intersession (one week non-credit course)

S	Satisfactory completion of requirements
U	Unsatisfactory completion of requirements

GPA/Class Ranking Policy
In light of IMSA's selective admission process and in order to promote collaborative exploration and discovery, the Academy does not compute grade point averages and class rankings.

Standardized Test Scores
Standardized test scores are provided by the student.

Student Inquiry and Research
(Inquiry and Mentorship) includes on-campus and off-campus experiences in which students plan, investigate, analyze, and communicate in-depth scholarly investigation, either guided or directed, by scientists, scholars, and/or educators.

TALENT (Total Applied Learning for Entrepreneurs)
Is a program that promotes entrepreneurial applied science and technology.

Federal and State Constitution Requirements
Are fulfilled with successful completion of American Studies.

Physical Education Requirement
Is fulfilled with successful completion (pass) of physical education or wellness.

Notice to persons or agencies receiving student records:
Section 438(b)(4)(B) of U.S. Public Law 93-380 requires that this pupil record information be transferred to you only on condition that you will not permit any other party to have access to it without the written consent of a parent/guardian or eligible student.

IMSA®
Illinois Mathematics and Science Academy
1500 Sullivan Road
Aurora IL 60506
Phone 630-907-5066 Fax 630-907-5922

Illinois Mathematics and Science Academy

The World's Leading Teaching and Learning Laboratory for Imagination and Inquiry

Student Inquiry and Research
Recommendation Form

Student Name **Braden Saltus** **Graduation Year** **2017**

Recommender **Joseph Traina** **jtraina@imsa.edu**
(name) (email)

Recommender: The student listed above wishes to participate in the Student Inquiry and Research (SIR) Program. SIR advisors are frequently requesting additional information so your assistance is needed in recommending and evaluating students. This completed form, as a pdf file, may be sent to off-campus individuals to assist with best placement of students.

1. Please rate the student on each of the following criteria, with 5 being highest and 1 being lowest, based on your experiences with IMSA students.

Criteria	5	4	3	2	1	No basis for judgment
Motivation for the investigation	X					
Intellectual potential		X				
Ability to analyze/problem solve	X					
Teamwork skills		X				
Perseverance	X					
Maturity		X				
Works independently		X				
Communication skills		X				
Integrity	X					
Overall judgment		X				

Please comment on the preparedness of the student to participate in an independent investigation.

Braden was a student in my Methods in Scientific Inquiry (MSI) class during the Fall 2014 semester. For his project in this class, he and his partner examined the effects of different fertilizer levels on chlorophyll concentration in corn plants. Braden is a very outgoing student with a lively sense of humor. His data analysis skills are strong for his age. His written work in my MSI course was consistently good, but not always indicative of his potential or best effort. Overall, Braden did well in my MSI course, and I am confident that he is well prepared to participate in the SIR Program.

Is there anything else that you feel a potential advisor should know about this student?

Thank you for completing this recommendation. Please return electronically to Judy Scheppler at quella@imsa.edu.

Illinois Mathematics and Science Academy

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Student Inquiry and Research
Recommendation Form

Student Name Braden Saltus graduation year _____

Recommender Sarah O'Leary-Driscoll soleary@imsa.edu
(name) (email)

Recommender: The student listed above wishes to participate in the Student Inquiry and Research (SIR) Program. SIR advisors are frequently requesting additional information so your assistance is needed in recommending and evaluating students. This completed form, as a pdf file, may be sent to off-campus individuals to assist with best placement of students.

1. Please rate the student on each of the following criteria, with 5 being highest and 1 being lowest, based on your experiences with IMSA students.

Criteria	5	4	3	2	1	No basis for judgment
Motivation for the investigation	x					
Intellectual potential	x					
Ability to analyze/problem solve	x					
Teamwork skills		x				
Perseverance		x				
Maturity	x					
Works independently	x					
Communication skills		x				
Integrity	x					
Overall judgment	x					

Please comment on the preparedness of the student to participate in an independent investigation.

I think Braden has matured quite a bit during his semester, and his work ethic and engagement show that he is motivated to do well in science. He does well in the lab, in particular, and is good at following written directions, rather than needing to be guided all the time along the way. I think a little more effort on his part would have made him an "A" student, as he clearly has the intellectual capability, but that being said, he was a benefit to our class, and I think he would do well with an investigation.

Is there anything else that you feel a potential advisor should know about this student?

Illinois Mathematics and Science Academy

The World's Leading Teaching and Learning Laboratory for Imagination and Inquiry

Student Inquiry and Research
Recommendation Form

Student Name Braden Saltus graduation year 2017

Recommender Peter Clancy pclancy@imsa.edu
(name) (email)

Recommender: The student listed above wishes to participate in the Student Inquiry and Research (SIR) Program. SIR advisors are frequently requesting additional information so your assistance is needed in recommending and evaluating students. This completed form, as a pdf file, may be sent to off-campus individuals to assist with best placement of students.

1. Please rate the student on each of the following criteria, with 5 being highest and 1 being lowest, based on your experiences with IMSA students.

Criteria	5	4	3	2	1	No basis for judgment
Motivation for the investigation	X					
Intellectual potential	X					
Ability to analyze/problem solve	X					
Teamwork skills		X				
Perseverance	X					
Maturity		X				
Works independently	X					
Communication skills	X					
Integrity	X					
Overall judgment	X					

Please comment on the preparedness of the student to participate in an independent investigation. Braden is a bright young man. He was always ahead of the class in his understanding of the concepts in SI Physics.

Is there anything else that you feel a potential advisor should know about this student?

NA